

Practitioner's Docket No. 03CR166/KE

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: P. McCusker et al.

Application No.: 10/629,286

Group No.: 3661

Filed: July 29, 2003

Examiner: B. Broadhead

For: Integrated Separation Assurance Method For An Aircraft

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TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION--37 C.F.R. § 1.192)

1. Transmitted herewith, in triplicate, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on December 15, 2005.

2. STATUS OF APPLICANT

This application is on behalf of other than a small entity.

CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a) and 1.10*

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37 C.F.R. § 1.8(a)

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Nathan O. Jensen

(type or print name of person certifying)

Date: February 9, 2006

* Only the date of filing (' 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under ' 1.8 continues to be taken into account in determining timeliness. See ' 1.703(f). Consider "Express Mail Post Office to Addressee" (' 1.10) or facsimile transmission (' 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

3. FEE FOR FILING APPEAL BRIEF

Pursuant to 37 C.F.R. § 1.17(c), the fee for filing the Appeal Brief is:

other than a small entity \$500.00

Appeal Brief fee due \$500.00

4. EXTENSION OF TERM

The proceedings herein are for a patent application and the provisions of 37 C.F.R. § 1.136 apply.

Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE

The total fee due is:

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6. FEE PAYMENT


Authorization is hereby made to charge the amount of \$500.00 to Deposit Account No. 18-1722.

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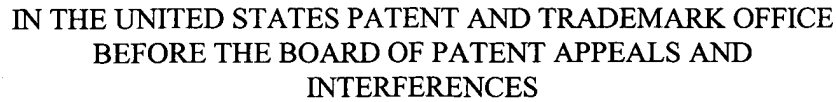
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In re Application of:
Patrick D. McCusker and
Eric N. Anderson

For: Integrated Separation Assurance Method For An Aircraft

Attorney Docket: 03CR166/KE

**Board of Patent Appeals and Interferences
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Examiner: B. Broadhead
(571) 272-6957

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NATHAN O. JENSEN
Printed Name

APPLICANT'S BRIEF ON APPEAL TO THE BOARD

This is an appeal from the final rejection of the Examiner dated July 15, 2005, rejecting all of the pending claims in the case. This Brief is accompanied by the requisite fee set forth in § 41.20(b)(2).

REAL PARTY IN INTEREST

The real party in interest in this appeal is the assignee, Rockwell Collins Inc.

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RELATED APPEALS AND INTERFERENCES

The application on appeal is not subject to, or an element in, any other appeal or interference proceeding within the U.S. Patent and Trademark Office.

STATUS OF CLAIMS

Claims 1-19 are pending, have been finally rejected, and are all on appeal. Claim 20 was cancelled by applicants in a previous Response.

STATUS OF AMENDMENTS

No amendments have been requested to be entered since the Final Rejection of July 15, 2005.

SUMMARY OF CLAIMED SUBJECT MATTER

Now referring to the Figures and specific passages in the specification, independent claim 1 recites a method of assuring separation between an aircraft and potential flight hazards (page 11 lines 1-3, Figure 2), comprising: predicting an intended path of an aircraft (page 7 lines 6-8; page 8 lines 23-24; Figure 2, reference number 70; Figure 6, reference number 82); identifying a potential hazard to the aircraft along the intended path (page 8 lines 27-29; Figure 6, reference number 84); determining a distance from the potential hazard that the aircraft is required to maintain (page 9 lines 11-13; Figure 2, reference numbers 42a and 48a); determining an ability of the aircraft to maneuver to avoid the identified hazard and to remain further from the identified hazard than the distance (page 9 lines 19-21; Figure 6, reference numbers 86 and 88); determining a probability that the aircraft will not maintain the distance from the

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identified hazards (page 9 lines 29-31); and alerting a pilot of the aircraft if the probability is greater than a predetermined level (page 11 lines 10-12; Figure 6, reference number 90).

Independent claim 11 recites a method of assuring separation between an aircraft and potential flight hazards (page 11 lines 1-3, Figure 2), comprising: predicting an intended path of the aircraft (page 7 lines 6-8; page 8 lines 23-24; Figure 2, reference number 70; Figure 6, reference number 82); accessing information relative to terrain proximal the aircraft (page 7 lines 21-24; Figure 1, reference number 18); receiving inputs representative of weather events proximal the aircraft (page 7 lines 24-26; Figure 1, reference number 20); receiving inputs representative of locations of nearby aircraft (page 7 line 26 – page 8 line 3; Figure 1, reference number 22); accessing separation information that provides a distance by which the aircraft must be separated from any of the terrain, weather events, and nearby aircraft (page 9 lines 11-19; Figure 1, reference number 28); determining a possibility that the aircraft, traveling along the intended path, will be less than the distance from any of the terrain, weather events, and nearby aircraft (page 9 lines 29-31); and advising a pilot of the aircraft if the possibility is above a predetermined threshold (page 9 line 31 – page 10 line 14; Figure 6, reference number 90).

Independent claim 18 recites a system for maintaining a required separation distance between an aircraft and potential hazards (page 7 lines 1-2; Figure 1), comprising: a processor (page 7 lines 2-5; Figure 1, reference number 12); a source for information on the flight path of the aircraft (page 7 lines 5-7; Figure 1, reference number 14); a plurality of hazard information sources that provide information on potential hazards to the aircraft, each of the hazard information sources providing an input to the processor (page 7 line 21 – page 8 line 4; Figure 1, reference numbers 18, 20, 22); a database of aircraft performance characteristics, the database accessible by the processor (page 8 lines 10-14; Figure 1, reference number 26); a source of required separation distances for each of the potential hazards, the source being accessible by the processor (page 8 lines 15-21; Figure 1, reference number 28); a plurality of sensors that provide inputs to the processor relative to the operating state of the aircraft

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(page 7 lines 7-20; Figure 1, reference number 16); wherein the processor determines a possibility that the aircraft, traveling along the flight path, will violate any of the required separation distances (page 9 lines 29-31), and whether the aircraft can maneuver to maintain the required separation distances (page 9 lines 19-28); and a visual notification apparatus configured to highlight at least one of a graphical representation of a potential hazard and at least part of a graphical representation of the flight path of the aircraft (page 9 line 29 – page 10 line 14; Figure 1, reference number 30; Figure 2, reference number 70a), to thereby advise of the possibility of a violation of any of the required separation distances.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

I. Claims 1-3, 9-15, and 17-19 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent Application Pub. No. 2004/0068372 to Ybarra, et al.

II. Claims 4-7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ybarra in view of U.S. Patent No. 6,085,147 to Myers.

III. Claim 16 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ybarra in view of U.S. Patent Application Pub. No. 2004/0024500 to Campbell.

IV. Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ybarra in view of Myers and Campbell.

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ARGUMENT

Ground of Rejection I: Anticipation by Ybarra

Claim 1

Ybarra discloses a threat avoidance system that uses various inputs to determine a threat to an aircraft. The system permits the adjustment of the inputs based upon different flight scenarios (see paragraphs 0038-0049, for example). However, Ybarra does not disclose alerting a pilot of the aircraft if the probability that the aircraft will not maintain the distance from the identified hazards *is greater than a predetermined level*, as recited in applicants' claim 1. As pointed out by the Examiner in the Final Rejection of July 15, 2005, Ybarra discusses assessing collision risk and providing alerts to the flight crew corresponding to the risks (see paragraph 0033). However, there is no discussion of a probability threshold that determines whether an aircraft pilot is alerted to a probability of breaching a separation distance, as recited in Applicants' claim 1. Contrary to the Examiner's assertion in the Advisory Action dated November 17, 2005, Ybarra does not disclose that 'if the risk is over a certain amount a warning is issued to the pilot.' Because Ybarra does not disclose every element of claim 1, claim 1 is therefore allowable over Ybarra.

Claim 11

Claim 11 includes subject matter similar to allowable claim 1, and all relevant arguments are hereby incorporated herein by reference. Specifically, Ybarra does not disclose advising a pilot of the aircraft if the possibility that the aircraft will not maintain the distance from the identified hazards *is above a predetermined threshold*, as recited in applicants' claim 11. Although Ybarra discusses assessing collision risk and providing alerts to the flight crew corresponding to the risks (see paragraph 0033), there is no discussion of a possibility threshold that determines whether an aircraft pilot is advised of a possibility of breaching a separation distance. Claim 11 is therefore allowable.

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Claim 17

Ybarra discloses a threat avoidance system that protects against terrain, traffic, and weather hazards. Ybarra does not disclose or suggest accessing information relative to areas of *restricted airspace proximal the aircraft*, as recited in applicants' claim 17 and mentioned at page 9 lines 3-4 in applicants' specification. Contrary to the Examiner's assertions, paragraph 0024 of Ybarra describes airport data as including "terrain data associated with an airport and descriptions of approaches and run ways into airports the aircraft is expected to have access to during the mission." There is no mention of restricted airspace proximal the aircraft, as asserted by the Examiner. Because the cited reference does not disclose all elements of claim 17, claim 17 is therefore allowable.

Claim 18

Claim 18 contains subject matter similar to allowable claims 1 and 11, and all relevant arguments previously presented are incorporated herein by reference. Specifically, claim 18 recites a visual notification apparatus configured to highlight at least one of a graphical representation of a potential hazard and at least part of a graphical representation of the flight path of the aircraft, to thereby advise of the possibility of a violation of any of the required separation distances. As previously pointed out, Paragraph 0025, cited by the Examiner against the recited limitations of amended claim 18, merely states that the threat processor 106 provides advice via signals to displays 152 and audio annunciators 154. Such a statement does not anticipate or suggest highlighting a graphical representation of a potential hazard, and at least part of a graphical representation of the intended path of the aircraft, as recited in applicants' claim 18. Claim 18 is therefore allowable.

Ground of Rejection II: Unpatentability over Ybarra in view of Myers

Claims 4-7

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Claims 4-7 depend directly or indirectly from allowable claim 1 and are therefore allowable for the same reasons claim 1 is allowable.

Ground of Rejection III: Unpatentability over Ybarra in view of Campbell

Claim 16

Claim 16 depends indirectly from allowable claim 11 and is therefore allowable for the same reasons claim 11 is allowable.

Ground of Rejection IV: Unpatentability over Ybarra in view of Myers and Campbell

Claim 8

Claim 8 depends indirectly from allowable claim 1 and is therefore allowable for at least the same reasons claim 1 is allowable.

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For the reasons set forth herein, the Examiner's final rejection of all of the claims should be reversed.

Respectfully Submitted,

February 9, 2006
Date

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CLAIMS APPENDIX

1. A method of assuring separation between an aircraft and potential flight hazards, comprising:

predicting an intended path of the aircraft;

identifying a potential hazard to the aircraft along the intended path;

determining a distance from the potential hazard that the aircraft is required to maintain;

determining an ability of the aircraft to maneuver to avoid the identified hazard and to remain further from the identified hazard than the distance;

determining a probability that the aircraft will not maintain the distance from the identified hazards; and

alerting a pilot of the aircraft if the probability is greater than a predetermined level.

2. The method of claim 1, wherein identifying a potential hazard further comprises:

receiving inputs representative of a weather event proximal the aircraft;

and

receiving inputs representative of an aircraft proximal the aircraft.

3. The method of claim 2, wherein identifying a potential hazard further includes accessing information representative of elevations of terrain proximal the aircraft.

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4. The method of claim 1, wherein determining the ability of the aircraft to maneuver comprises accessing a database of aircraft performance characteristics that includes aircraft ceiling and aircraft range.

5. The method of claim 4, wherein determining the ability of the aircraft to maneuver further comprises analyzing inputs from a plurality of aircraft sensors to ascertain a current configuration of the aircraft.

6. The method of claim 5, wherein the aircraft sensors measure at least one of an aircraft flap position, an aircraft slat position, a landing gear position, a throttle position, and an engine-out status for any engine of the aircraft.

7. The method of claim 4, wherein determining the ability of the aircraft to maneuver further comprises determining the current operating state of the aircraft.

8. The method of claim 7, wherein determining the current operating state of the aircraft includes determining at least two of an engine pressure ratio for any engine of the aircraft, engine temperature, and an RPM of an engine of the aircraft.

9. The method of claim 1, wherein predicting an intended path of the aircraft includes obtaining input from an onboard avionics navigation system.

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10. The method of claim 1, wherein alerting the pilot includes highlighting at least one of
a graphical representation of the potential hazard, and
at least part of a graphical representation of the intended path of the aircraft.

11. A method of assuring separation between an aircraft and potential flight hazards, comprising:

- predicting an intended path of the aircraft;
- accessing information relative to terrain proximal the aircraft;
- receiving inputs representative of weather events proximal the aircraft;
- receiving inputs representative of locations of nearby aircraft;
- accessing separation information that provides a distance by which the aircraft must be separated from any of the terrain, weather events, and nearby aircraft;
- determining a possibility that the aircraft, traveling along the intended path, will be less than the distance from any of the terrain, weather events, and nearby aircraft; and
- advising a pilot of the aircraft if the possibility is above a predetermined threshold.

12. The method of claim 11, wherein determining a possibility that the aircraft will be less than the distance from any of the terrain, weather events, and nearby aircraft includes determining an ability of the aircraft to maneuver to maintain the distance.

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13. The method of claim 12, wherein determining the ability of the aircraft to maneuver comprises accessing a database of aircraft performance characteristics that includes aircraft ceiling and aircraft range.

14. The method of claim 12, wherein determining the ability of the aircraft to maneuver further comprises analyzing inputs from a plurality of aircraft sensors to ascertain a state of a configuration of the aircraft, and further wherein the aircraft sensors are configured to measure at least one of an aircraft flap position, an aircraft slat position, a landing gear position, a throttle position, and an engine-out status for any engine of the aircraft.

15. The method of claim 12, wherein determining the ability of the aircraft to maneuver further comprises determining the current operating state of the aircraft.

16. The method of claim 15, wherein determining the current operating state of the aircraft includes determining at least one of engine temperature and an RPM of an engine of the aircraft.

17. The method of claim 11, further comprising:
accessing information relative to areas of restricted airspace proximal the aircraft;

accessing separation information that provides a distance by which the aircraft must be separated from the restricted airspace;

determining a possibility that the aircraft, traveling along the intended path, will be less than the distance from the restricted airspace; and

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advising a pilot of the aircraft if the possibility is above a predetermined threshold.

18. A system for maintaining a required separation distance between an aircraft and potential hazards, comprising:

- a processor;
 - a source for information on the flight path of the aircraft;
 - a plurality of hazard information sources that provide information on potential hazards to the aircraft, each of the hazard information sources providing an input to the processor;
 - a database of aircraft performance characteristics, the database accessible by the processor;
 - a source of required separation distances for each of the potential hazards, the source being accessible by the processor;
 - a plurality of sensors that provide inputs to the processor relative to the operating state of the aircraft;
- wherein the processor determines a possibility that the aircraft, traveling along the flight path, will violate any of the required separation distances, and whether the aircraft can maneuver to maintain the required separation distances; and
- a visual notification apparatus configured to highlight at least one of a graphical representation of a potential hazard and at least part of a graphical representation of the flight path of the aircraft, to thereby advise of the possibility of a violation of any of the required separation distances.

19. The system of claim 18, wherein the plurality of hazard information sources provides information on at least two of nearby weather events, nearby aircraft traffic, and nearby terrain elevation features.

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EVIDENCE APPENDIX

None.

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RELATED PROCEEDINGS APPENDIX

None.